

Computer Science Engineering

EN010301 B ENGINEERING MATHEMATICS II

2-2-0 (CS, IT)

Credits 4

MODULE 1 Mathematical logic (12 hours)

Basic concept of statement, logical connectives, Tautology and logical equivalence – Laws of algebra of propositions – equivalence formulas – Tautological implications (proof not expected for the above laws, formulas and implications). Theory of inference for statements – Predicate calculus – quantifiers – valid formulas and equivalences – free and bound variables – inference theory of predicate calculus

MODULE 2 Number theory and functions (12 hours)

Fundamental concepts – Divisibility – Prime numbers- relatively prime numbers – fundamental theorem of arithmetic – g.c.d - Euclidean algorithm - properties of gcd (no proof) – l c m – Modular Arithmetic – congruence – properties – congruence class modulo n – Fermat's theorem – Euler's Totient functions - Euler's theorem - Discrete logarithm Function – types of functions – composite functions – inverse of a function – pigeon hole principles

MODULE 3 Relations (10 hours)

Relations – binary relation – types of relations – equivalence relation – partition – equivalence classes – partial ordering relation – Hasse diagram – poset

MODULE 4 Lattice (14 hours)

Lattice as a poset – some properties of lattice (no proof) – Algebraic system – general properties – lattice as algebraic system – sublattices – complete lattice – Bounded Lattice – complemented Lattice – distributive lattice – homomorphism – direct product

MODULE 5 Graph Theory (12 hours)

Basic concept of graph – simple graph – multigraph – directed graph – Basic theorems (no proof) .

Definition of complete graph , regular graph, Bipartite graph, weighted graph – subgraph – Isomorphic graph – path – cycles – connected graph.- Basic concept of Eulergraph and Hamiltonian circuit – trees – properties of tree (no proof) - length of tree – spanning tree – sub tree – Minimal spanning tree (Basic ideas only . Proof not expected for theorems)

References

1. S.Lipschutz, M.L.Lipson – Discrete mathematics –Schaum's outlines – Mc Graw Hill
2. B.Satyanarayana and K.S. Prasad – Discrete mathematics & graph theory – PHI
3. Kenneth H Rosen - Discrete mathematics & its Application - Mc Graw Hill
4. H. Mittal , V.K.Goyal, D.K. Goyal – Text book of Discrete Mathematics - I.K. International Publication
5. T. Veerarajan - Discrete mathematics with graph theory and combinatorics - Mc Graw Hill

EN010 302 Economics and Communication Skills

(Common to all branches)

Teaching scheme

2 hours lecture and 2 hours tutorial per week Credits: 4(3+1)

Objectives

. To impart a sound knowledge of the fundamentals of Economics.

Economics

Module I (7 hours)

Reserve Bank of India-functions-credit control-quantitative and qualitative techniques Commercial banks-functions- Role of Small Industries Development Bank of India and National Bank for Agriculture and Rural Development The stock market-functions-problems faced by the stock market in India-mutual funds

Module II (6 hours)

Multinational corporations in India-impact of MNC's in the Indian economy Globalisationnecessity - consequences Privatisation-reasons-disinvestment of public sector undertakings.

The information technology industry in India-future prospects

Module III (6 hours)

Direct and indirect taxes- impact and incidence- merits of direct and indirect taxesprogressive and regressive taxes-canons of taxation-functions of tax system- tax evasionreasons for tax evasion in India-consequences-steps to control tax evasion Deficit financingrole-problems associated with deficit financing

Module IV (5 hours)

National income-concepts-GNP, NNP, NI, PI and DPI-methods of estimating national income-difficulties in estimating national income Inflation-demand pull and cost push-effects of inflation-government measures to control inflation

Module V (6 hours)

International trade-case for free trade-case for protectionism Balance of payments-causes of disequilibrium in India's BOP-General Agreement on Tariffs and Trade-effect of TRIPS and TRIMS in the Indian economy-impact of WTO decisions on Indian industry

Text Books

1. Ruddar Datt, Indian Economy, S.Chand and Company Ltd.
2. K.K.Dewett, Modern Economic Theory, S.Chand and Company Ltd.

References

1. Paul Samuelson, Economics, Tata McGraw Hill
2. Terence Byres, The Indian Economy, Oxford University Press
3. S.K.Ray, The Indian economy, Prentice Hall of India
4. Campbell McConnel, Economics, Tata McGraw Hill

Communication Skills

Objectives

- ▶ To improve Language Proficiency of the Engineering students
- ▶ To enable them to express themselves fluently and appropriately in social and professional contexts
- ▶ To equip them with the components of different forms of writing

MODULE – 1 (15 hours)

INTRODUCTION TO COMMUNICATION

Communication nature and process, Types of communication - Verbal and Non verbal, Communication Flow-Upward, Downward and Horizontal, Importance of communication skills in society, Listening

skills, Reading comprehension, Presentation Techniques, Group Discussion, Interview skills, Soft skills

MODULE – II (15 hours)

TECHNICAL COMMUNICATION

Technical writing skills- Vocabulary enhancement-synonyms, Word Formation-suffix, affix, prefix, Business letters, Emails, Job Application, Curriculum Vitae, Report writing- Types of reports

Note: No university examination for communication skills. There will be internal evaluation for 1 credit.

REFERENCES

17. The functional aspects of communication skills, P.Prasad and Rajendra K. Sharma, S.K. Kataria and sons, 2007
18. Communication skills for Engineers and Scientists, Sangeeta Sharma and Binod Mishra, PHI Learning private limited, 2010
19. Professional Communication, Kumkum Bhardwaj, I.K. International (P) House limited, 2008
20. English for technical Communication, Aysha Viswamohan, Tata Mc Graw Publishing company limited, 2008

CS010 303: Problem Solving and Computer Programming

(Common with IT010 306)

Objectives

- . *To impart the basic concepts of problem solving using a computer.*
- . *To learn about the structure of C programming language.*

Module I (10 hours)

Problem solving: Steps in Computer programming – Features of a good program – Problem solving using Algorithms and Flowcharts.

C fundamentals: Character set, Constants, Identifiers, keywords, basic data types, Variables, Operators, Expressions, Statements, Input and Output statements – Structure of a C program – simple programs.

Module II (13 hours)

Control statements: if, if-else, nested if – switch – while – do-while – for – break & continue – nested loops.

Single dimensional arrays – defining an array, array initialisation, accessing array elements – Programs for sequential search, bubble sort, binary search. Multidimensional arrays – defining a two dimensional array, array initialisation, accessing elements – Programs for matrix processing.

Module III (12 hours)

Strings: declaring a string variable, reading and displaying strings, string related library functions – Programs for string matching and sorting. Functions: Function definition, function call, function prototype, parameter passing, void function – Recursion – Passing array to function. Macros: Defining and calling macros – Difference between macro & function.

Module IV (13 hours)

Structures: defining a structure variable, accessing members, array of structures, passing structure to function.

Unions: difference with structure, defining union variable, accessing members.

Pointers: declaration, operations on pointers, passing pointer to a function, accessing array elements using pointers, processing strings using pointers, pointer to pointer, array of pointers, pointer to array, pointer to function, pointer to structure, self referential structure.

Module V (12 hours)

Files : Different types of files in C – Opening & Closing a file – Writing to and Reading from a file – Processing files – Library functions related to file – fseek(), ftell(), ungetc(), fread(), fwrite() – Dynamic memory allocation, Storage Class associated with variables: automatic, static, external and register. Additional features: Enumerated data type, bitwise operators, typedef.

References

1. Programming with C - Byron S. Gottfried, Tata McGraw Hill.
2. Computer Programming in C - Kernighan & Ritchie, PHI
3. Programming in C - Stephen C. Kochan, CBS publishers.
4. Programming in C (5e) – E. Balaguruswamy , Mc Graw Hill
5. Let us C – Yashwant Kanetkar, BPB.
6. A Book on C – Al Kelley and Ira Pohl, Addison-Wesley
7. Mastering Turbo C - Stan Kelly Bootle, BPB Publications.
8. Programming and Problem Solving with PASCAL - Micheal Schneider, Wiley Eastern Ltd. (Module 1)
9. Pointers in C - Yashwant Kanetkar, BPB
10. The Spirit of C- by Munish cooper, Jaico Books.

CS010 304: Computer Organization

Objectives

To develop a good understanding of a complete computer system through an integrated approach to hardware, software and processor design.

To emphasise on both background theory and actual design.

Module I (10 hours)

CPU - Arithmetic: Signed addition and subtraction –BCD adder – Multiplication – Array multiplier – Booth's Algorithm, Division – Restoring and non-restoring division.

Module II (12 hours)

Floating-point arithmetic- addition, subtraction, multiplication, division. Decimal arithmetic addition subtraction, multiplication, division. ALU - design of arithmetic, logical, arithmetic logical unit

Module III (14 hours)

Control Logic Design – Control Organization – Hardware control, Microprogram control (design for specific problems)– Microprogram sequencer, Horizontal and vertical micro instructions.

Module IV (12 hours)

Memory: - Memory hierarchy –Principle of inclusion-memory interleaving techniques. Disk memory - Data organisation on disk- Disk performance –Disk caching. Main memory-SRAM, DRAM, ROM –Associative memory, Scratchpad memory-Cache memory – Levels of Cache - Mapping techniques, Associative, Direct, and Set Associative-Main memory update policies.

Module V (12 hours)

Virtual Memory:-Overlay-Need for virtual memory-Address translation-Translation Look Aside Buffer-Relocation techniques- static, dynamic-Paged memory-Page table, Page frame data table- Segmented memory-Paged segments.

Reference Books

1. M.Morris Mano- *Computer System Architecture*- PHI- Third Edition-2006

2. M.Morris Mano – *Digital Logic and Computer Design* - PHI -2004
3. Carl Hamacher, Zvonko Vranesic, Safwat –*Computer Organization*-McGrawHill- Fifth Edition
4. David A.Patterson,John L.Hennessy-*Computer Organization and Design*-MKArm Edition
5. V.Carl Hamacher,Zvonko G. vranesic,Safwat G.Zaky-*Computer Organization* - McGrawHill-Fourth Edition
6. Behrooz parhami-*Computer Architecture*-Oxford University Press

CS010 305 SWITCHING THEORY AND LOGIC DESIGN

(Common with IT010 304)

Objectives:-

To introduce the principles of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Computer Architecture and Design.

Module 1: (14 Hrs)

Number Systems and Codes:- Decimal, Binary, Octal and Hexadecimal Number systems, Codes- BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.

Switching Theory:- Boolean Algebra- Postulates and Theorems, De' Morgan's Theorem, Switching Functions- Canonical Forms- Simplification of Switching Functions- Karnaugh Map and Quine Mc-Clusky Methods.

Module 2: (12 Hrs)

Combinational Logic Circuits:- Review of Basic Gates- Universal Gates, Adders, Subtractors, Serial Adder, Parallel Adder- Carry

Propagate Adder, Carry Lookahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and Demultiplexer, PLA and PAL.

Module 3(12 Hrs)

Sequential Logic Circuits:- Latches and Flip Flops- SR, JK, D, T and MS Flip Flops, Asynchronous Inputs. Clocked Sequential Circuits:- State Tables State Equations and State Diagrams, State Reduction and State Assignment, Design of Clocked Sequential Circuits using State Equations.

Module 4: (10 Hrs)

Counters and Shift Registers:- Design of Synchronous and Asynchronous Counters:- Binary, BCD, Decade and Up/Down Counters , Shift Registers, Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.

Module 5(12 Hrs)

Fault Tolerance and Diagnosis : Concepts of Fault and Hazards- Fault Tolerance in Combinational Circuits- Fault Table, Fault Detection methods-Boolean Difference and Path Sensitizing Methods- Digital ICs- Digital Logic Families- Characteristics- Introduction to RTL, TTL,ECL, MOS and CMOS Logics.

Reference Books

1. Zvi Kohavi *Switching and Finite Automat theory*, Tata McGrwHill
2. Morris Mano *Digital Logic and Computer Design*, Prentice Hall of India
3. Floyd T.L. *Digital Fundamentals* , Universal Bookstall

4. Biswas N.N. *Logic System Theory* Prentice Hall of India
5. Leach D. Malvino A.P. & Saha – *Digital Principles and Applications*- Tata McGrawHill
6. Taub, Helbert and Schilling, *Digital Integrated Electronics* TMH

CS010 306(EC): Electronics Devices and Circuits

Objectives

- . To impart the basic concepts of discrete integrated electronics
- . To develop understanding about the working and operation of various circuits using discrete and integrated components.

Module I (12hours)

Power supplies: Half wave, full wave and bridge rectifiers- L, C, LC and . filters (working only)- Zener voltage regulator, transistor series and shunt voltage regulator, voltage regulator ICs, 78XX and 79XX series

Module II (12hours)

Transistor Amplifiers: Bipolar transistor models and characteristics, current and voltage characteristics, BJT as a switch, BJT circuits at DC, Need for biasing, Q point selection, Concepts of load line, Bias stability, Biasing in BJT amplifier circuits, Small signal operation and model, transconductance, single stage BJT amplifiers

Module III (12hours)

Integrated Circuits: Operational Amplifier, Simplified model, Ideal OP-Amp approximation and characteristics, Non inverting amplifier, Inverting amplifier, OP-Amp characteristics, Voltage follower, Difference Amplifier, Instrumentation amplifier, Summation amplifier

Module IV (12hours)

Feedback: Concept of feedback, positive and negative feedback, types of feedback, Effect of feedback on amplifier performance, Stability of feedback circuits

Oscillators: Condition for oscillators, General form of oscillator circuit, RC phase shift oscillators, Wein bridge oscillator using OP-Amp, Working of Hartley, Colpitt's and crystal oscillators

Module V (12hours)

RC circuits: Response of high pass and low pass RC circuits to sine, step, pulse and square inputs, clipping and clamping circuits, RC integrator and differentiator, Working of astable, mono-stable and bi-stable multivibrators using OP-Amp, Working of Schmitt trigger, 555 timer and its application.

Reference Books

1. Integrated Electronics – Milman , Halkias – TMH
2. Microelectronic circuits – Sedra , Smith – Oxford university press
3. Fundamentals of microelectronics – B Razavi - Wiley
4. Design with Op-Amp and analog integrated circuits – S Franco – TMH
5. Pulse, digital and switching waveforms – Milman, Taub - TMH

CS010 307(P): Programming Lab

Objectives

- . To acquaint the students with the fundamentals of programming.*
- . To provide the students with good knowledge in C programming and develop problem solving skills.*

1. Familiarisation with computer system compilers, editors and operating systems etc.
2. Familiarisation with office packages
3. Programming experiments in C to cover input output statements, control statements, functions, string, arrays, Structures, pointers and files.
4. Programmes to find factorial, Fibonacci series, palindrome, matrix operations, sort a set of names, search etc.

Any experiment according to the syllabus of CS010 303 can be substituted.

CS010 308 LOGIC DESIGN LAB

Objectives:-

To provide an introduction to Logic Systems Design thereby giving a hands on experience on working with digital ICS ,which enable the study Computer System Architecture.

1. Familiarization of Logic Gates and Realization of Logic Circuits using basic Gates.
2. Design and implementation of Arithmetic Circuits:- Half Adder, Full Adder, n bit Ripple Carry Adder, Carry Look ahead Adder, BCD Adder
3. Study of Flip Flops:- implementation of RS, JK, D, T and MS Flip Flops
4. Design and implementation of Synchronous and Asynchronous Counters, UP/DOWN Counters

Syllabus III Sem. Computer

5. Design and Implementation of Shift Registers, Counters using Shift Registers – Ring Counter and Johnson Counter
6. Study of Multiplexers, Demultiplexers, Encoder and Decoder
7. Design of Comparators and Parity Generators.